

**Joint Graduate Meeting of the Ethological Society  
and the Behavioural Biology Section of the DZG  
08.11. – 10.11.2023**



**Programme and Abstract Booklet**

**Location:** Bielefeld University, Universitätsstraße 25, 33615 Bielefeld, Germany

Organisation by: Sabine Kraus, Christian Nawroth & Ahana A. Fernandez

## Table of content

<b>Venue &amp; Travel</b> .....	3
<b>Awards</b> .....	7
<b>Help and Emergency</b> .....	7
<b>Programme</b> .....	8
<b>Wednesday, November 8th</b> .....	8
<b>Thursday, November 9th</b> .....	9
<b>Friday, November 10th</b> .....	11
<b>Abstracts</b> .....	12
<b>Keynote talk Wednesday</b> .....	13
<b>Keynote talk Thursday</b> .....	14
<b>Session 1: Physiology &amp; Behaviour</b> .....	15
<b>Session 2: Animal Welfare</b> .....	19
<b>Session 3: Cognition</b> .....	23
<b>Session 4: Social Behaviour</b> .....	27
<b>Posters:</b> .....	31

## **Venue & Travel**

### **Address**

Universität Bielefeld  
Universitätsstraße 25  
D-33615 Bielefeld

### **Travel by train**

Bielefeld Hbf, then take tram line 4 in the direction of Lohmannshof to the stop "Universität" (journey time 7 minutes).

Cabs are always available directly in front of the main station. The fare to the university is currently about Euro 16.

### **Travel by car**

From the north: Motorway A2: Exit Bi-Ost, Detmolder Str. direction Zentrum (6 km, approx. 10 min). Way via Kreuzstr., Oberntorwall, Stapenhorststr., Kurt-Schumacher-Str. (is signposted).

From the south: A2 motorway. At the Bielefeld junction, take the A33 towards Bi-Zentrum, exit Bi-Zentrum, towards the centre on Ostwestfalendamm (B61), exit Universität, follow Stapenhorststr., Kurt-Schumacher-Str. (is signposted).

There are numerous free parking spaces available on campus.

### **Public transport within Bielefeld**

The university is well connected to the city center by public transport.

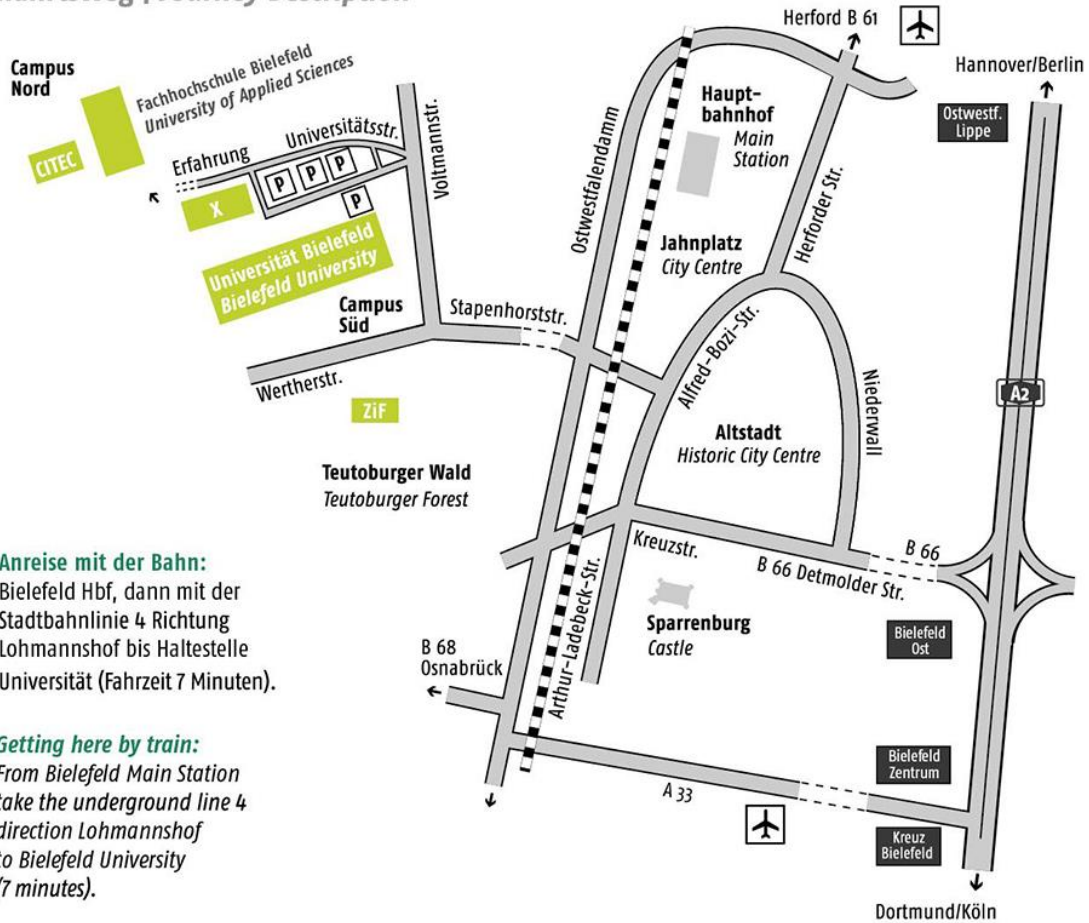
By tram you can reach the university from the central station or the Jahnplatz in a few minutes with the tram line 4 (stop "Universität").

The bus lines 21, 61 and 62 also go from the city center to the university (bus stop Wellensiek Süd).

## Maps

<https://www.uni-bielefeld.de/uni/anreise-kontakt/lageplaene/index.xml>

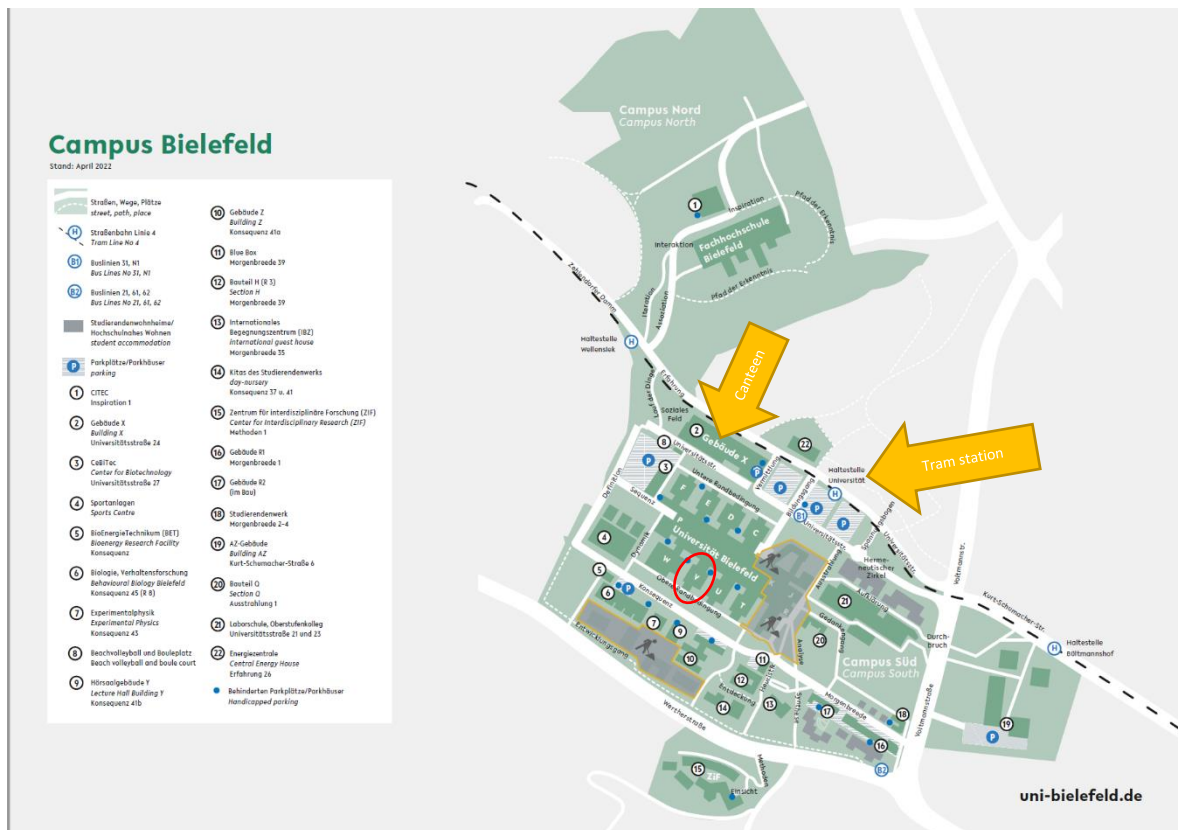
### Anfahrtsweg | Journey Description



**Anreise mit der Bahn:**  
Bielefeld Hbf, dann mit der  
Stadtbahnlinie 4 Richtung  
Lohmannshof bis Haltestelle  
Universität (Fahrzeit 7 Minuten).

**Getting here by train:**  
From Bielefeld Main Station  
take the underground line 4  
direction Lohmannshof  
to Bielefeld University  
(7 minutes).

## Campus map



The meeting will take place in the Main Building of the University in room **V2-105/115**.

University main building → second floor in area **V** → follow the signs

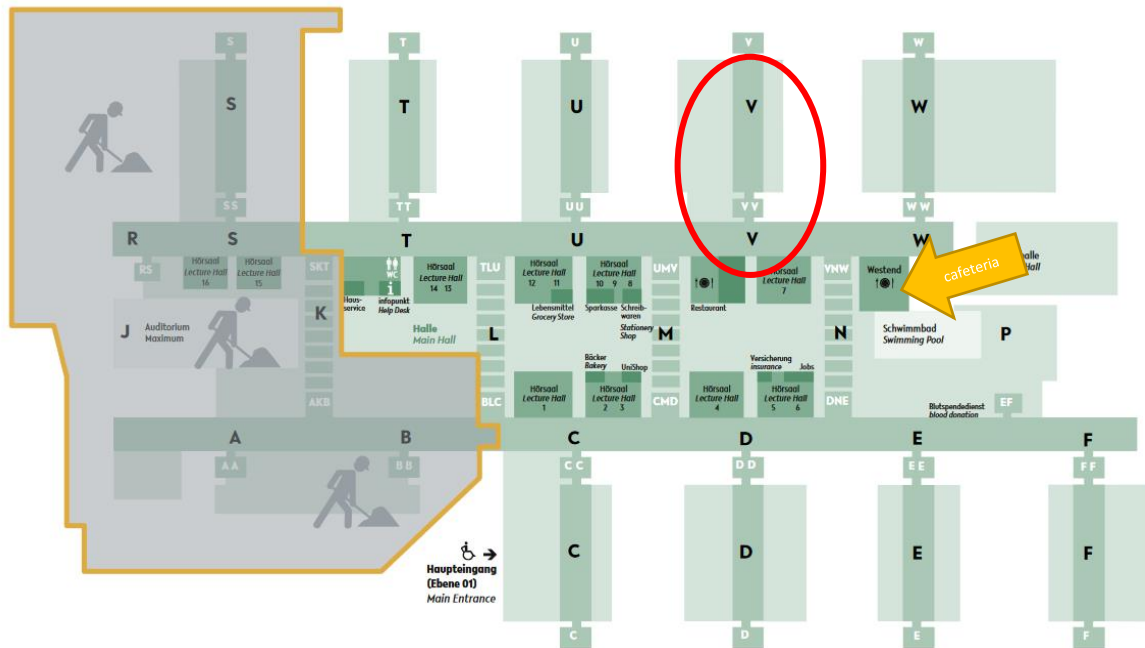
## Map of the main building:



### Universitätshauptgebäude (Ebene 0)

Aufzugs- und Treppentürme  
Lifts and Staircase Towers

Stand: Februar 2020



uni-bielefeld.de

The meeting will take place in the Main Building of the University in room **V2-105/115**.

University main building → second floor in area **V** → follow the signs


## Awards


There will be an award for the best poster and an award for the best talk. The winners will be awarded by vote of all participants. Please put in your votes until Friday, 10th November at 10:35.


Winners will receive a book surprise.


## Help and Emergency

All emergency calls are answered by the University's central control in order that they can inform the emergency services of access routes and so that in-house support can be immediately provided.

Fire/ accident (University internal landline):  **112**

Fire/ accident (from mobile phone):  **0521 - 106 112**

Police (University internal landline):  **110**

Police (from mobile phone):  **0521 - 106 110**

More information: <https://www.uni-bielefeld.de/themen/hilfe-notfall/index.xml>

# Programme

## Wednesday, November 8th

until 3:00 PM: Arrival

3:00 PM: Welcome

3:15 PM: **Keynote talk by Dr. Angela S. Stoeger: *Vocal learning in elephants***

4:15 PM: Coffee break

### 4:35 PM: **Session 1: Physiology & Behaviour**

4:35 PM: James Stranks

*Glucocorticoids and the dynamics of sociality in male Assamese macaques*

4:55 PM: Melanie Gleske

*Social niche conformance in male guinea pigs: behavioural profiles and hormone concentrations during the juvenile phase, adolescence and adulthood*

5:15 PM: Maximilian Baldy

*Social niche conformance in male guinea pigs: behavioural and hormonal profiles over the course of the ontogeny and reproductive success in a competitive situation*

5:35 PM: Sofia Rizzi

*50 scents of Bechstein's bats: Exploring Gland Secretion Variability and Behavioral Responses*

5:55 PM: Poster placement / Icebreaker / Idea collection for discussion/workshop topics for Thursday



## Thursday, November 9th

9:00 AM: Welcome and organization

### 9:10 AM: **Session 2: Animal Welfare**

9:10 AM: Marlene Sroka

*Investigating consequences of personality differences for animal welfare*

9:30 AM: Maelle Calas

*An exploratory study on horse's lying behaviour*

9:50 AM: Marie Roig-Pons

*Feeding horses in groups: effect of feeding management on horses' social behaviour and welfare*

10:10 AM: Constantin Beck

*Effects of simple enrichments, noise, and visitors on greater guinea pigs in zoo husbandry*

10:30 AM: Coffee break

### 11:00 AM: **Session 3: Cognition**

11:00 AM: Eva Mardus

*The study of physical cognition in wild animals*

11:20 AM: Elena Groneberg

*Lefty or righty? Investigating behavioural lateralisation in rats*

11:40 AM: Alina Schaffer

*Cognition in Ungulates*

12:00 AM: Annkatrin Pahl

*Dwarf goats show altruistic behaviour in a novel food giving paradigm*

12:20 AM: Lunch

1:30 PM: **Keynote talk by Dr. Antonino Calapai: *Enhancing primate cognition: an autonomous and adaptive approach to cognitive training, assessment, and enrichment of captive non-human primates***

2:30 PM: Coffee break and Poster Session

Posters:

Jana Deutsch

*Goats that stare at video screens - behavioural responses of goats towards images of familiar and unfamiliar con- and heterospecifics*

Carmen Schwietz

*A Bird's Personality and its Bacterial Reality: Exploring the Zebra Finch Microbiota*

Emma Cyplik & Bent Bollgönn

*What is the state of the status signalling hypothesis in birds? A systematic review and meta-analysis*

Shreya Dimri

*Estimating among individual variation in reaction norms: a meta-analytical approach*

Celine Kretschmann

*The Journey Is Its Own Reward – Cognitive Enrichment for Laboratory Mice and Its Effects on Animal Welfare*

3:30 PM: Workshop/Discussion Round - until 5:00 PM

6:00 PM: Social dinner at the restaurant "Nichtschwimmer"

## Friday, November 10th

9:00 AM: Welcome and organization

9:10 AM: **Session: Social Behaviour**

9:10 AM: Jasmin Laura Gerfen

*Same procedure as last year? Uncovering parental investment strategies in the Common Swift*

9:30 AM: Sacha Engelhardt

*Allonursing altruism in reindeer*

9:50 AM: Paul Huber

*Leaving No One Behind – Social Dispersal in a burying beetle*

10:10 AM: Tim-Philipp Lütkemeyer

*If it fits I sits? - Oviposition-site selection in *Lobofemora* sp.*

10:30 AM: Last Coffee Break

11:00 AM: Awards and Closing

11:10 AM: Tour through the institute

12:20 PM: Lunch/Closing (finishing around 2 PM)

# Abstracts

## Keynote talk Wednesday

**Dr. Angela S. Stoeger (Austrian Academy of Science & University of Vienna):**  
***Vocal learning in elephants***

Vocal production learning is a crucial cognitive skill for human speech and language development. Fundamental to cognitive research is the question of whether the mechanisms underpinning human speech (i.e., fundamental components such as vocal production learning) are shared or distinct from those of nonhuman animals. Using a cross-species comparative approach, research aims at revealing which species, apart from humans, are capable of vocal learning and to what extent. According to a prevailing paradigm, the term vocal learning is used to the primary modes of learning that may influence vocalizations. This framework categorizes vocal learning into vocal usage learning, and vocal production learning.

Elephants are known for their compound vocal communication, characterized by the rumble, a vocalization with fundamental frequencies in the infrasonic range that is used in a variety of contexts and as a long-distance contact call. Yet, what makes elephants vocal communication distinctive is their remarkable vocal plasticity, including context-dependent within-call type flexibility. Elephants have control over several systems for sound production, including their larynx, as well as synapomorphic sound sources. They are capable of complex vocal usage learning, and along with whales, dolphins, seals and bats, elephants belong to a diverse and dissimilar group of non-human mammals proven capable of vocal production learning, i.e., of structurally modifying signals as a result of auditory experience.

This presentation will offer a synopsis of two decades of research on the vocal communication of elephants. It encompasses various aspects such as the production of sounds, the cognitive and internal factors that influence the acoustic structure of elephant vocal signals, and the adaptive function of these signals in both African savanna (*Loxodonta africana*) and Asian elephants (*Elephas maximus*), all of which are crucial for comprehending the elephant vocal learning phenotype.

## Keynote talk Thursday

**Dr. Antonino Calapai (German Primate Center): *Enhancing primate cognition: an autonomous and adaptive approach to cognitive training, assessment, and enrichment of captive non-human primates***

Thanks to recent ethical and technological advancements, autonomous computer-based approaches have significantly enhanced cognitive training, assessment, and enrichment for captive non-human primates. Through techniques like unsupervised training, machine learning for ID tagging systems, and multiple-choice interfaces, individualized cognitive stimulation can be provided to monkeys directly in their enclosures, without necessitating social isolation or fluid restriction. Beyond mere feasibility, our findings highlight that this approach serves as a comprehensive platform for psychophysical and cognitive evaluations of non-human primates, in compliance with the 3Rs principles. Marmosets, Long-tailed macaques, and Rhesus macaques interacted with the paradigms at their own pace, exhibiting high engagement and proficiency. Interestingly, there was evident interspecies and inter-individual variability in both preferences and interaction styles. This approach holds promise in not only deepening our understanding of primate cognition but also in elevating the well-being of captive non-human primates.

## Session 1: Physiology & Behaviour

Presenter: James Stranks

Author: J. Stranks

Affiliation: University of Göttingen

Title: *Glucocorticoids and the dynamics of sociality in male Assamese macaques*

Dominance and affiliative relationships can have a major impact on glucocorticoids, a key hormonal mediator of homeostasis and an indicator of physiological stress. The “cost of subordination” hypothesis predicts that individuals with a lower dominance rank will have higher glucocorticoid values whereas the social buffering hypothesis suggests that the presence of bonded affiliative partners buffers against increased physiological stress. Hormonal changes will therefore correlate with dynamics in both affiliative and dominance relationships. We tested the predictions of these two hypotheses in wild male Assamese macaques (*Macaca assamensis*), who form and maintain long-lasting cooperative social bonds with each other that lead to higher dominance ranks and reproductive success. We combined glucocorticoid metabolite data from more than 4100 fecal samples with extensive behavioural data of 62 adult males, collected from 2006 to 2021 at Phu Khieo Wildlife Sanctuary, Thailand. We found that contrary to the cost of subordination hypothesis, dominance rank was positively correlated with GCs but we did find evidence to support the social buffering hypothesis. Dynamics in the strength of the top affiliation had an inverse relationship with GCs, with a decrease in bond strength correlating with higher physiological stress. In addition, we found evidence for seasonal and temporal dynamics in GCs. Our study highlights the need to consider the dynamic nature of sociality and the importance of the underlying competitive regimes that influence physiological processes.

## Session 1: Physiology & Behaviour

Presenter: Melanie Gleske

Author: M. Gleske

Affiliation: Department of Behavioural Biology, University of Münster

Title: *Social niche conformance in male guinea pigs: behavioural profiles and hormone concentrations during the juvenile phase, adolescence and adulthood*

The individualised social niche results from the interactions of an individual with its social environment. Since the social environment in which an individual is living can change during lifetime, it is important that individuals are able to conform to different individualised social niches. This social niche conformance can happen through shaping of behavioural and endocrine phenotypes. Our goal in this study is to fully understand social niche conformance in guinea pigs as a model organism by investigating when, how and why behavioural profiles are modulated in individual males during three phases of ontogeny (juvenility, adolescence, adulthood).

For this approach, male guinea pigs will live in two distinct social environments: while males of both groups will live in heterosexual pairs, males of one group will be socially stimulated (e.g., an unfamiliar individual is introduced into the focus males home enclosure) regularly, while males of the other group will not.

In my project I will analyse the development of individual hormonal and behavioural phenotypes of males living in these different social environments during the different ontogenetic phases separately. Baseline cortisol, cortisol responsiveness and testosterone concentrations will be determined several times in each phase. In addition to that, a battery of behavioural tests to assess social behaviour, risk-taking behaviour and anxiety-like behaviour will be conducted at the end of the respective ontogenetic phase.

By proceeding this way, it should be elucidated when exactly adjustments of the phenotype (behavioural and hormonal profile) - based on social experiences can occur over the course of life.



## Session 1: Physiology & Behaviour

Presenter: Maximilian Baldy

Author: M. Baldy

Affiliation: Department of Behavioural Biology, University of Münster

Title: *Social niche conformance in male guinea pigs: behavioural and hormonal profiles over the course of the ontogeny and reproductive success in a competitive situation*

During the course of their lives, individuals live in different environments under different conditions, the way the individuals interact with these environments constitute different individualised niches. The aim of this project is to elucidate how male guinea pigs conform to their individualised social niche. To accomplish this, it tries to find out when, how and why behavioural and hormonal profiles in individual males are modulated.

In order to achieve this, male guinea pigs, all of which live in heterosexual pairs, are divided into 2 groups. Half of the animals receive social stimulation 3 times per week, where unfamiliar animals are introduced to their enclosures, the other half do not receive this stimulation. This simulates different social environments. The animals are continuously monitored over the course of several life stages, from infancy, through adolescence until adulthood under the conditions described above. During this period, they are tested several times for basal cortisol levels, cortisol reactivity, and testosterone levels. Their behaviour is also recorded and analysed. After 19 weeks, the animals are tested in a series of experiments, which include the hormonal parameters mentioned above as well as various behavioural parameters and the composition of chemical scents. Subsequently, one male from the socially stimulated group and one male of the same age from the no-stimulation group are placed together in an enclosure with two unknown females for 5 weeks. The paternities of the offspring produced during this period and thus the reproductive success of the males from the two different environments are determined.

In conclusion, this project aims to elucidate the mechanisms and evolutionary reasons for the process of individualisation, specifically through the mechanism of niche conformance.

## Session 1: Physiology & Behaviour

Presenter: Sofia Rizzi

Author: S. Rizzi

Affiliation: University of Greifswald

Title: *50 scents of Bechstein's bats: Exploring Gland Secretion Variability and Behavioral Responses*

Bats, as most nocturnal and highly social animals, rely heavily on olfaction to navigate their complex world. However, there is a significant gap in our understanding of the interplay between glands, gland secretions, and behavior in bats. In this study, we sought to shed light on this intriguing relationship by investigating the interaural gland secretion of free-ranging Bechstein's bats.

To do so, we sampled secretions from three maternity colonies over two years, and we analysed them using Gas Chromatography-Mass Spectrometry (GC-MS). Moreover, we performed behavioral tests using a Y-maze to explore the potential role of these gland secretions in roostmate recognition. The analysis of the secretions revealed a pattern of high yearly, seasonal, and colony-based variation. Although the behavioral tests proved more challenging than anticipated, resulting in limited data, the results suggest that bats did not display significant responses to these secretions in the context of roostmate recognition. Altogether, our findings highlight the high complexity of gland secretions both in terms of substance content and time variation, and the hardships of testing behavioural responses to such multidimensional cues on wild animals.

## Session 2: Animal Welfare

Presenter: Marlene Sroka

Authors: M. Sroka<sup>1</sup>, C. Dohmen<sup>1,2</sup>, O. Ambree<sup>2</sup>, S.Kaiser<sup>1</sup>, H. Richter<sup>1</sup>

Affiliations: <sup>1</sup>Münster University, <sup>2</sup>Osnabrück University

Title: *Investigating consequences of personality differences for animal welfare*

Evolutionary and behavioural ecology place emphasis on the existence and ecological importance of consistent individual differences in behaviour (“animal personality”). Animal welfare science, by contrast, focusses on mean population levels, largely neglecting personality differences. We here combine both fields and argue that animal personality might be of relevance for animal welfare too. In laboratory praxis, animal housing conditions are typically standardised and often constrain exploration behaviour. However, individuals with distinct exploration types might experience identical housing differently. More specifically, a barren environment might affect highly explorative individuals more adversely than less explorative individuals. Against this background, we hypothesise to observe personality-dependent welfare impairments in response to the housing condition. To address that question, 72 female C57BL6/J mice were characterised for their personality type in exploration. Extreme personality types (i.e. the 24 most and the 24 least explorative individuals) were set up in pairs - one of each exploration type - in standard housing. 12 of the 24 pairs had additional access to super-enriched cages, that were equipped with continuously changing enrichment items. We monitored individual welfare using a multi-domain approach, including spontaneous home cage behaviour, stress hormones and immune competence. Our results will evaluate a new approach in applied animal welfare research and allow for a shift of perspectives.

## Session 2: Animal Welfare

Presenter: Maelle Calas

Authors: M. Calas<sup>1,2</sup>, I. Bachmann<sup>1</sup>, M. Roig-Pons<sup>1</sup>

Affiliations: <sup>1</sup>Agroscope, Schweizer Nationalgestüt SNG, Avenches, SWITZERLAND, <sup>2</sup> Institut agro Dijon, Dijon, FRANCE

Title: *An exploratory study on horse's lying behaviour*

The recumbent position is essential two hours per day for horses to achieve deep sleep. Several studies have already studied the lying behaviour of horses but many of them contradict each other in their results. The aim of this exploratory study is to link individual and collective factors, still little studied, with measurements of the lying behaviour and to study the consequences of a lack of recumbent rest.

These measurements were carried out using accelerometers placed on 14 horses over a four-month duration. These horses went through four periods with different housing and foraging systems. Personality and judgment bias tests were conducted, as well as a musculoskeletal health examination and wound records. For data analysis, linear mixed models were used.

Results show that housing is linked with recumbent time which was significantly reduced in the paddock-trails (MeanLying = 35min ± 39) than in the stalls (MeanLying = 125min ± 85), whereas foraging had no significant link. Some personality traits are negatively related with lying-down time: gregariousness (-14min), stress under pressure (-107min) and hierarchical status (-66min).

Regarding health, no link was established between wounds and recumbent rest, but the number of osteopathic blockages was negatively related to it. There also appears to be a link between the loss of lying time from one period to the next and measured optimism.

To conclude, some factors seem to have an influence on the time horses spend recumbent and a lack of recumbent rest appears to be deleterious to the well-being of these animals.

## Session 2: Animal Welfare

Presenter: Marie Roig-Pons

Authors: Marie Roig-Pons<sup>1,2</sup>, Emilie Bossu<sup>2</sup>, Sabrina Briefer<sup>2</sup>

Affiliations: <sup>1</sup>University of Bern, <sup>2</sup>Agroscope

Title: *Feeding horses in groups: effect of feeding management on horses' social behaviour and welfare*

Keeping horses in group is highly recommended, as it has been shown to improve their well-being. However, many horse keepers are reluctant to do so, particularly because of the risk of injury. The risk of injury is related to the aggressiveness of group members and several studies have suggested that the hay availability is associated with the level of aggressiveness. The aim of our study was therefore to compare the effect of different hay availabilities and the duration of breaks between meals on the horses' social interactions (aggressiveness, spatial proximity, affiliative behaviour) and on their welfare (injuries, lying behaviour). Four groups of 4 to 5 mares were subjected to three different feeding treatments, following a latin-square design: Traditional (TD) - 3 meals of 2 hours per day, Portioned (PO) - 6 meals of one hour per day and Slowfeeding (SF) - hay ad libitum, covered by a net.

For each treatment, after 3 weeks of habituation, each group was observed for 15 hours (180 hours of observation in total). Social interactions were then recorded continuously using a voice recorder and a scan sampling was carried out every 15 minutes to monitor spatial proximity between horses and their activity (feeding, lying, standing, walking or resting). A wound record was performed on days 2 and 4 after a baseline had been established, to record the location, size and severity of each new injury. The lying behaviour was assessed using MSR accelerometers. The data is currently being processed and analysed.

## Session 2: Animal Welfare

Presenter: Constantin Beck

Authors: C. Beck, H. Richter, S. Kaiser, M. Göbel

Affiliations: WWU Münster - Department of Behavioural Biology

Title: *Effects of simple enrichments, noise, and visitors on greater guinea pigs in zoo husbandry*

The welfare of zoo animals is an important issue in terms of ethical concerns and legal reasons, as well as for good work of zoos regarding educational, conservational and economical success. Visitors play an important role in the latter, but are also a key factor in influencing the welfare of zoo animals. This influence can be assessed as positive, negative, or neutral. In addition, noise levels, which are possibly but not necessarily connected to visitors, can also impact animal welfare. The influences of both factors are, among other aspects, strongly dependent on species, making it important to assess the impact for each species separately. An important tool for improving animal welfare is environmental enrichment. Based on the natural needs of the animals, enrichment should provide opportunities to cope with challenges, increase behavioural diversity, and reduce abnormal behaviour, thereby improving the overall animal welfare. The effects of enrichment should also be assessed on a species-specific basis to ensure that welfare is improved and to rule out adverse effects.

While many studies have investigated the effects of enrichment, visitor numbers and noise levels on large and popular species in zoos, smaller and less popular species have rarely been studied. Therefore, this study investigated the effects of these factors on greater guinea pigs (*Cavia magna*) in zoo husbandry. To this end, the behaviour and spatial location of the animals within the enclosure was recorded in relation to different combinations of two types of enrichment (safety and variety enrichment), the number of visitors and noise levels.

### Session 3: Cognition

Presenter: Eva Mardus

Authors: E. Mardus<sup>1,2</sup>, Mirjam Knörnschild<sup>1,3</sup>

Affiliations: <sup>1</sup>Museum für Naturkunde Leibniz-Institut für Evolutions- und Biodiversitätsforschung, <sup>2</sup>Freie Universität Berlin, <sup>3</sup>Humbolt–Universität zu Berlin

Title: *The study of physical cognition in wild animals*

Cognitive processes are the basis of many behaviors. Therefore, cognition plays an essential part in understanding behavior. By comparing the cognitive performance of different taxa, we can draw conclusions about the selection pressures that have enabled the evolution of cognition. For this reason, it is necessary to study cognition broadly across many taxa. Within the study of cognitive processes, physical cognition is the understanding of objects and that their interaction with the environment follows fixed causal and spatial relations. Aspects of physical cognition, like memory, spatial orientation, object permanence or numerical competence, just to name a few, historically have been studied in a laboratory setting often using permanently captive animals. The need for a laboratory setting however limits greatly which species can be studied for their cognitive abilities. For this reason, one should think about how to adapt established protocols used in a laboratory setting to investigate physical cognition of wild animals. Here, I present ideas to modify these classical laboratory protocols to study physical cognition in wild animals. How should we adapt cognition experiments with the inclusion of ecological relevance for these animals? And how can we engage wild animals in cognition experiments?

### Session 3: Cognition

Presenter: Elena Groneberg

Authors: E. Groneberg, H. Richter, S. Kaiser

Affiliation: Münster University

Title: *Lefty or righty? Investigating behavioural lateralisation in rats*

“The left-handed men are precious; they take places which are inconvenient for the rest.” This quote from the novel “Les Misérables” written in 1862 by Victor Hugo reveals that already centuries ago humans were aware of the imbalance of right- and left-handers. Indeed, only 10% of the human population is left-handed. This strong population bias is remarkable and became an interesting subject of research. But over the years the assumption that handedness is a unique human characteristic could be refuted. In fact, individual side preferences can be found in many different species.

Fagot and Vauclair (1991, Psychological Bulletin) first mentioned the task-complexity hypothesis, stating that it is more likely to find a population bias in lateralisation in demanding tasks compared to simple routine behaviours. The aim of our study was to test the task-complexity hypothesis in rats to get more information about the functioning of behavioural lateralisation in rodents. Moreover, we wanted to know whether paw preference is stable over time. Therefore, all rats participated in paw preference tests of different complexity repeatedly. In complex tasks, we could find temporal stability of the direction of lateralisation. Moreover, lateralisation was stronger for complex behaviours like using a tool compared to routine behaviours like climbing. However, we observed a decline in strength over time. Nevertheless, these results suggest an influence of task-complexity for the expression of behavioural lateralisation in rodents.



### **Session 3: Cognition**

Presenter: Alina Schaffer

Authors: A. Schaffer, A. L. Caicoya, R. Holland, A. Widdig, F. Amici

Affiliations: University of Leipzig, University of Barcelona, Zoo Leipzig, University of Leipzig, University of Leipzig

Title: *Cognition in Ungulates*

Over the past century, a large number of studies have experimentally investigated cognitive abilities in animals, providing a huge dataset on the distribution of specific cognitive abilities across taxa. By comparing cognitive abilities across species, researchers can detect variations in problem-solving abilities and better understand the direct processes that lead to the emergence of complex cognition. One reason why some species may have evolved different cognitive abilities is that they face specific ecological challenges in foraging, which they can overcome more efficiently through the evolution of complex cognition and thus greater behavioral flexibility. Another reason may be that social complexity may be a strong selective pressure for the evolution of improved cognitive abilities. When social life is complex, individuals must use flexible cognitive strategies to recognize other individuals, keep track of their relationships, and predict, coordinate, and manipulate their behaviour. Apart from interspecific variation, cognition is also characterized by important differences between similar individuals, with factors such as sex, age, rank, sociality, or early life environment potentially influencing individual performance on cognitive tasks. In this project, ungulates are used to directly test socio-ecological hypotheses about the evolution of cognition, as they are an ideal model to test cognitive abilities from a comparative perspective. Several tasks are used to assess the physical perception of ungulates. The first tasks test the animals' understanding of objects (e.g. object permanence, properties, gravity, quantity). A gaze-following task was used to test their social cognitive abilities and also their innovation skills were tested.

### Session 3: Cognition

Presenter: Annkatrin Pahl

Authors: A. Pahl<sup>1</sup>, J.-L. Rault<sup>2</sup>, C. Nawroth<sup>1</sup>, J. McGetrick<sup>2</sup>, J. Langbein<sup>1</sup>

Affiliations: <sup>1</sup>Applied Ethology Unit, Institute of Behavioural Physiology, Research Institute for Farm Animal Biology (FBN), Dummerstorf, Germany, <sup>2</sup>Institute of Animal Husbandry and Animal Welfare, University of Veterinary Medicine Vienna, Austria

Title: *Dwarf goats show altruistic behaviour in a novel food giving paradigm*

Altruism can strongly impact social dynamics in groups, by strengthening bonds and potentially decreasing stress. We developed a novel helping paradigm based on natural climbing behaviour of goats. We used an apparatus that consisted of a pedestal and a food dispenser both attached to a swivel arm. By climbing onto the pedestal, the dispenser with a food reward was brought within reach of the conspecific (receiver) while the goat on the pedestal (donor) had no access to the reward. Goats were tested in dyads and underwent three sessions: two test sessions with a functional apparatus and one control session without food reward. We defined the behaviour from a donor goat as being more or less egoistically motivated by scoring whether she entered a defined zone around the food dispenser within the first five seconds after leaving the pedestal (egoistic) or not (egoistic). We found that goats interacted more often with the pedestal when food was involved (test1 vs. control:  $p < 0.001$ ; test2 vs. control:  $p < 0.001$ ). In addition, goats that stood on the pedestal for longer were less likely to directly approach the dispenser ( $p < 0.001$ ;  $DF = 1$ ;  $F = 35.228$ ), indicating that the defined distinction between non-egoistic and egoistic pedestal interactions is mirrored by the duration of those pushing events. Our results show that this paradigm could be easily operated by the goats, indicating its biologically relevant nature. It can therefore be used as foundation for future research on altruistic behaviour in goats.

## Session 4: Social Behaviour

Presenter: Jasmin Laura Gerfen

Authors: J. L. Gerfen, K. Witte

Affiliation: Universität Siegen, Institute for biology

Title: *Same procedure as last year? Uncovering parental investment strategies in the Common Swift*

Due to long-distance migration, a restricted diet, and an exceptional long development time of the young, the common swift (*Apus apus*) is a bird species known for its extreme lifestyle. This makes it a suitable organism for investigating life history strategies. Differences in breeding success, even between individuals of the same breeding colony, suggest variation in parental investment strategies. We have the great opportunity to investigate the breeding behavior in a breeding colony near Olpe, Germany. The habit of this species to return to its breeding site each year and often mate with the same partner enables us to generate long-term data. Thereby we can discover changes in the investment strategies and observe individuals for consecutive years to determine factors influencing such strategies. Here I will present an overview of our research questions and methods we use to investigate parental investment and uncover variation within and between individuals.

## Session 4: Social Behaviour

Presenter: Sacha Engelhardt

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Title: *Allonursing altruism in reindeer*

Allonursing is the nursing of the offspring of other mothers. Cooperation can be explained by at least three evolved decision rules: 1) direct reciprocity, i.e. help someone who previously helped you, 2) kin discrimination, i.e. preferentially direct help to kin than to non-kin, and 3) generalized reciprocity, i.e. help anyone if helped by someone. We assessed if semi-domesticated reindeer, *Rangifer tarandus*, mothers allonursed according to the decision rules of direct reciprocity, generalized reciprocity and kin discrimination over 2 years. To assess if reindeer mothers allonursed according to the direct reciprocity decision rule, we predicted that mothers should give more help to those who previously helped them more often. To assess if reindeer mothers allonursed according to the kin discrimination decision rule, we predicted that help given should increase as pairwise genetic relatedness increased. To assess if reindeer mothers allonursed according to the generalized reciprocity decision rule, we predicted that the overall number of help given by reindeer mothers should increase as the overall number of help received by reindeer mothers increased. The number of help given i) increased as the number of help received increased in the 2012 group but not in both 2013 groups, and ii) was not influenced by relatedness. The overall number of help given increased as the overall number of help received increased. The kin discrimination decision rule was not supported. The results suggest that reindeer mothers may allonurse according to the direct reciprocity and generalized reciprocity decision rules.

## Session 4: Social Behaviour

Presenter: Paul Huber

Authors: P.Huber; S. Steiger

Affiliation: University of Bayreuth

Title: *Leaving No One Behind – Social Dispersal in a burying beetle*

The timing of dispersal of offspring from their birth site is an important life-history trait with tremendous effects on future reproductive success. While often genetically determined, the timing of dispersal is also influenced by environmental and social cues. As part of family interactions, individuals are even able to adjust their dispersal time in response to their surrounding family to increase their indirect fitness gains. For example, in the house wren, fledging-ready chicks delay their own dispersal when growing alongside younger chicks to increase the survival chances of their younger siblings. While avian and mammalian dispersal behaviours have been extensively studied, similar investigations into sub-social insect species remain sparse. Here, we investigated sibling interactions and dispersal behaviour in the burying beetle *Nicrophorus vespilloides*, a species with facultative brood care, whereby offspring profits from the presence of parents but can also survive and develop in the absence of parental care. To gain a deeper insight into the mechanisms involved in sibling interactions, we tested how older and therefore more independent siblings affect their younger counterparts in the absence of parents. To this end, we compared growth rates of newly hatched *N. vespilloides* larvae cohabitating with older larvae to those residing with age-matched siblings. Surprisingly, we found that while there was no effect of sibling age on growth rate after 24 hours, it influenced the dispersal behaviour of the larvae. Younger larvae left their carcass resource earlier and with a lighter weight when growing alongside older larvae, compared to conditions with age-matched siblings.

## Session 4: Social Behaviour

Presenter: Tim-Philipp Lütkemeyer

Author: T.-P. Lütkemeyer

Affiliation: Bielefeld University

Title: *If it fits I sits? - Oviposition-site selection in Lobofemora sp.*

Optimal Oviposition-site selection (OSS) is a key component of an individual's fitness and thus expected to be under strong selection. However, OSS implies the active search for suitable sites, giving rise to an interplay between optimal oviposition and optimal foraging. I herein argue, that this interplay manifests itself in the repeated evolution of selective oviposition strategies within the Phasmatodea (stick and leaf insects) from an ancestral state of dropping eggs. Still, little is known on natural oviposition sites or the cues and behavioural steps utilized for locating and accepting sites in this lineage. With the aim to establish a stick insect model system for selective oviposition, I herein describe the oviposition-site preferences, small to medium range searching and oviposition behaviour as well as selected life-history traits of *Lobofemora sp.* from the Kon Chu Rang Nature Reserve. Individuals exposed to arrays with holes of different diameter and depth were found to prefer holes which are capable of concealing the full length of the egg. Life-history measures of isolated individuals suggest a tendency towards clustering eggs in time and space as long as oviposition sites are available. Lastly, collected video material indicates that inserting the antennal flagella into the hole plays a substantial role in evaluating and accepting a particular site as well as the spatial coordination of the targeted oviposition. The observation of this antennal sampling behaviour stimulates ongoing experiments on active searching, exploring the sensory basis of decision-making.

## Posters:

Presenter: Jana Deutsch

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Title: *Goats that stare at video screens - behavioural responses of goats towards images of familiar and unfamiliar con- and heterospecifics*

Many domestic farm animal species are descendants from prey animals, equipped with a heightened vigilance towards novel stimuli. This might impede our ability to correctly assess their cognitive capacities as it might hamper their active decision-making in choice tasks. We here present a promising approach to study goat perception and cognition adhering also stronger to the 3Rs principle than conventional testing paradigms. In our looking time paradigm, we assessed the attention of 10 dwarf goats (*Capra hircus*) towards images of familiar and unfamiliar con- and heterospecifics using an experimental apparatus containing two video screens. Subjects were confronted with images on either the left or the right screen of the apparatus while the other screen remained empty. The presented images were single faces of either familiar or unfamiliar goats or humans, presented for 10 seconds each. Subjects'™ looking behaviour was assessed and analysed using LMMs. Goats paid more attention towards images depicting other goats compared to human but did not show substantial differences in their looking behaviour when presented with familiar vs. unfamiliar individuals. This indicates that goats are capable of discriminating between two-dimensional con- and heterospecific faces, but also that they either lack the ability to categorise other individuals using 2D face images alone or might be unable to recognise these 2D images as representations of real-life subjects. The looking time paradigm developed here is a promising approach to investigate a variety of other research questions linked to how domestic ungulate species perceive their physical and social environment.

## Posters:

Presenter: Carmen Schwietz

Authors: C. Schwietz, S. Kraus, Ö. Maraci

Affiliation: Bielefeld University

Title: *A Bird's Personality and its Bacterial Reality: Exploring the Zebra Finch Microbiota*

Animals show consistent individual differences in their behaviours, called personality. These differences are assumed to be influenced by multiple factors, such as environmental and genetic factors. Recent research in laboratory rodents and humans pointed out a novel source of individual variation in their behaviour: the microbial communities residing in the gastrointestinal tracts (gut) of animals. The microbiota can modulate host behaviour via different pathways. However, we still know very little about host-microbiome interaction and its potential impacts on personality.

To get deeper insights into this topic, we search for connection between the gut microbiome and the differences in the individual behaviour of wild-type zebra finches *Taeniopygia guttata*. To receive information about individual personality traits, we tested zebra finches bi-directionally selected for three personality traits: aggression against a mirror image, exploration in a novel environment and fearlessness measured by the duration of tonic immobility. At the same time as behavioural testing, we collected faecal samples. These samples are used to characterise the gut microbiota using 16S ribosomal RNA gene sequencing to understand whether certain behavioural traits are associated with individual variations in the gut microbiota.

Our study aims to expand our knowledge of the evolutionary implications of host-microbiome interactions.



## Posters:

Presenters: Emma Cyplik & Bent Bollgönn

Authors: E. Cyplik\*, B. Bollgönn\*, A. Kalinowski, A. Sánchez-Tójar

Affiliation: University Bielefeld

Title: *What is the state of the status signalling hypothesis in birds? A systematic review and meta-analysis*

Birds are surprisingly variable in their individual appearance. Over the last five decades, it has often been suggested that plumage traits which vary among individuals (e.g. colour, size, etc.) may signal body condition, fighting ability and/or general individual quality (e.g. (Rohwer, 1975), (Mateos & Carranza, 1997), (Vedder et al., 2010); reviewed in (Senar, 2006)). In social species, where every member arguably benefits from being in the group, the status signalling hypothesis (also known as the badge of status hypothesis) suggests that signals of dominance status would evolve (Dawkins & Krebs, 1978). The status signalling hypothesis predicts that individuals would express honest signals of their position in the dominance hierarchy, so called “badges of status”, because it would allow them to avoid costly fights over resources (Rohwer, 1975). A meta-analysis conducted about a decade ago synthesised the results of 47 studies performed across 23 different bird species and found general support for a positive (although heterogeneous) association between dominance and plumage traits, providing overall evidence for the status signalling hypothesis (Santos et al., 2011). However, Santos et al.’s (2011) analyses also found evidence of both small-study and decline effects, suggesting that publication bias may have affected their conclusions. More recently, a meta-analysis testing the status signalling hypothesis in arguably its textbook example, the house sparrow (*Passer domesticus*), found strong evidence of publication bias challenging the validity of the status signalling hypothesis in explaining the function of house sparrows’ bib size (Sánchez-Tójar et al., 2018). The aim of our synthesis is to update the state of our knowledge on the status signalling hypothesis in birds by performing a systematic review and meta-analysis across bird species by including all literature that has been published as well as the studies used in Santos et al. (2011) and by utilising recently developed methods to study and account for publication bias (Nakagawa et al., 2022).

## Posters:

Presenter: Shreya Dimri

Authors: S. Dimri, S. Salazar, K. Reinhold, H. Schielzeth, A. Sanchez Tojar

Affiliations: Bielefeld University, Jena University

Title: *Estimating among individual variation in reaction norms: a meta-analytical approach*

Individual differences in animal behavior and physiology are important drivers of ecological and evolutionary processes. Variation in reaction norms, which describes how traits change in response to environmental variation for a given genotype, is a key aspect of these individual differences. While many studies use mixed-effects modeling to account for individual variation in reaction norms, few have quantified the magnitude of this variation. As such, the prevalence and magnitude of among-individual variation in reaction norms is not well-understood. We estimate the contribution of among-individual variation to total phenotypic variation and explore how accounting for this variation changes our inferences about population-level effects. We test the prediction that it explains only a small part of the total phenotypic variation in wild populations. We first systematically searched for studies using random-slope mixed-effects models to study phenotypic traits in non-human, non-inbred organisms, in the field or brought to controlled lab settings. Our analytical approach then builds on recent methodological advances that allow us to reanalyse published open datasets and integrate them using meta-analysis. The systematic literature search yielded 1765 unique references, out of which, 1196 passed the title-and-abstract screening, but only 170 provided open data and could then be reanalysed. Our results will provide a comprehensive and rigorous synthesis of the current state of knowledge on individual variation in reaction norms across species. These findings will be key to understand individuality, and thus, particularly important for the fields of animal personality and plasticity.

## Posters:

Presenter: Celine Kretschmann

Author: C. S. Kretschmann

Affiliation: University of Münster

Title: *The Journey Is Its Own Reward – Cognitive Enrichment for Laboratory Mice and Its Effects on Animal Welfare*

Cognitive enrichment (CE) displays a relatively new subset of environmental enrichment that is yet to be fully understood and developed. In this study, it was investigated whether a maze with an increasing difficulty level can function as CE for laboratory mice. To answer this question, twenty female C57BL/6J mice were divided into two groups: one receiving the CE treatment and the other receiving a similar but non-cognitive enriching treatment. Several welfare parameters, such as the home cage activity, stereotypic and affiliative behaviours, and faecal corticosterone metabolite levels, were examined across baseline, enrichment and post-enrichment conditions. Further behavioural tests for locomotory, exploratory, and anxiety-like behaviour were conducted at the end of the experimental phase. Virtually no significant differences between the treatment groups were found, except for the affiliative behaviour during the treatment. However, the different conditions were found to have effects on the mice's morning activity, affiliative behaviour, and faecal corticosterone metabolite levels. The results of the maze itself suggested that the mice were highly motivated to participate in the treatment and displayed competence and agency when engaging in the cognitive task. Moreover, there were indications that the CE was intrinsically rewarding for the mice. Taken together, this study was able to endorse the customisable maze as an appropriate challenge for laboratory mice. The findings contribute to the advancing development of CE and the understanding of its effects on animal welfare. Further research is needed to examine the full potential of this cognitive task.

# Behavioural Biology



**Graduate Meeting 2023**

*We are looking forward to seeing you!*

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